

THE CLAIMS

What is claimed is:

1. A pump comprising:

5 a pump housing having an axis and comprising a cover having a face surface and a body having a face surface positioned about the axis, with an arcuate channel defined in the face surface of the cover and an arcuate channel defined in the face surface of the body, said arcuate channels having a length that extends at least partially circumferentially about the axis;

10 an inlet opening extending through the cover and coupled to the cover channel;
an outlet opening extending through the body and coupled to the body channel; and
an impeller positioned between the face surface of the cover and the face surface of the body,

15 wherein at least one of the cover channel or the body channel has a cross-sectional shape along at least part of its length that includes a lower section and an upper section, with the lower section having a semi-elliptical, partial semi-elliptical, or partial semi-circular shape, and the upper section having a pair of straight walls that are coupled to the lower section.

20 2. The pump of claim 1, wherein both the cover channel and the body channel have a cross-sectional shape along at least part of their lengths that includes a lower section and an upper section, with the lower section having a semi-elliptical, partial semi-elliptical, or partial semi-circular shape, and the upper section having a pair of straight walls that are coupled to the lower section.

25 3. The pump of claim 2, wherein the cover and body channels both have a cross-sectional shape that includes a first cross-section positioned at a first point in the respective channel and a second cross-section positioned at a second point in the respective channel, wherein the first cross-section is different from the second cross-section.

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4. The pump of claim 3, wherein the first cross-section of the cover channel is different from the first cross-section of the body channel, and the second cross-section of the cover channel is different from the second cross-section of the body channel.

5 5. The pump of claim 3, wherein the first and second cross-sections of the lower sections of the cover channel are the same, and the first and second cross-sections of the upper sections of the cover channel are different; and the first and second cross-sections of the lower sections of the body channel are the same, and the first and second cross-sections of the upper sections of the body channel are different.

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6. The pump of claim 5, wherein the first cross-section of the upper section of the cover channel has a height that is greater than a height of the second cross-section of the upper section of the cover channel.

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7. The pump of claim 5, wherein the first cross-section of the upper section of the cover channel has a height that tapers to a height of the second cross-section of the upper section of the cover channel; and the first cross-section of the upper section of the body channel has a height that tapers to a height of the second cross-section of the upper section of the body channel.

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8. The pump of claim 3, wherein the lower section of the cover and body channels has a bottom with a flattened shape.

9. The pump of claim 3, wherein the pair of straight walls of the upper sections of the cover and body channels are perpendicular to the face surface of the respective body and cover.

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10. The pump of claim 1, further comprising a transition section between the upper and lower sections of the cover and body channels, wherein the transition section includes at least one radius for smoothing the connection between the upper and lower sections.

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11. The pump of claim 1, further comprising a vent purge hole positioned in the cover channel and extending through the cover.

5 12. The pump of claim 1, wherein the cover is made of aluminum or plastic and the body is made of aluminum or plastic.

13. The pump of claim 1, wherein the cover channel is manufactured by casting and machining the cover channel, and the body channel is manufactured by casting and
10 machining the body channel.

14. A pumping channel defined in a housing of a fuel pump comprising:
an arcuate recess defined in a surface of the housing, said arcuate recess having a length that extends from a first end to a second end, with the second end being spaced from
15 the first end, the arcuate recess having a cross-sectional shape along at least part of its length that includes a lower section and an upper section, with the lower section having a semi-elliptical, partial semi-elliptical, or partial semi-circular shape, and the upper section including a pair of straight walls that are coupled to the lower section.

20 15. The pumping channel of claim 14, wherein the arcuate recess extends at least partially around a circumference of the housing surface near the outer periphery thereof, and the cross-sectional shape includes a first cross-section positioned at a first point in the arcuate recess and a second cross-section positioned at a second point, wherein the first cross-section is different from the second cross-section.

25 16. The pumping channel of claim 15, wherein the first and second cross-sections lower sections are the same, and the first and second cross-sections upper sections are different.

30 17. The pumping channel of claim 16, wherein the first cross-section upper section has a height that is greater than a height of the second cross-section upper section.

18. The pumping channel of claim 15, wherein the upper section has a height at the first cross-section that tapers to a height at the second cross-section.

5 19. The pumping channel of claim 15, wherein the first cross-section is positioned in the vicinity of the first end of the arcuate channel, and the second cross-section is positioned in the vicinity of the second end of the arcuate channel, and the first cross-section upper section has a height that is greater than a height of the second-cross-section upper section, and the upper section tapers in height from the first cross-section to the second cross-
10 section.

20. The pumping channel of claim 14, wherein the lower section has a bottom with a flattened shape.

15 21. The pumping channel of claim 14, wherein the pair of straight walls of the upper section are perpendicular to the surface of the housing.

22. The pumping channel of claim 14, wherein the pair of straight walls of the upper section are angled relative to the surface of the housing, with each of the pair of walls
20 being angled outwardly relative to the opposing wall.

23. The pumping channel of claim 14, further comprising a transition section positioned between the lower section and the upper section, wherein the transition section includes a radiused surface for smoothly connecting the upper and lower sections together.
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24. The pumping channel of claim 14, wherein the housing surface is at least one of a cover or a body of a fuel pump.